



# Care of FARM DAIRY EQUIPMENT



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## FOR LOW-COUNT MILK

- Use seamless metalware, preferably of stainless steel, in good condition.
- Wash the milking equipment according to directions *after each milking*.
- Have two sets of inflations. Soak one set in 5 percent lye solution for a week, then use it and soak the other set.
- Replace inflations regularly.
- Wash air hoses and vacuum lines regularly.
- Use top-grade dairy cleaners and sanitizers.
- Use an acid rinse to keep mineral deposits from forming.
- Wash and sanitize the bulk tank each time it is emptied.
- Sanitize all other milk-handling equipment before using it.

# CARE OF FARM DAIRY EQUIPMENT

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Modern milk-handling equipment requires constant care to keep it sanitary. The more specialized the equipment, the more specialized the care needed. Neglect of one link in the chain of operations may cause a high count of bacteria in the milk.

Further, today's market demands higher-quality milk than has been accepted in the past. This is true for milk products as well as for fluid milk. Among other things, higher quality means fewer bacteria. For a high-quality product you must handle the milk so that few bacteria get into it and cool it promptly to keep those in it from multiplying.

In a nutshell, the secret of producing low-count milk is to keep the milking equipment in good physical condition, to clean it thoroughly after each milking, to sanitize it just before using and to cool the milk properly.

Though most of the bacteria in milk were once thought to come from dust in the stable air, tests have shown that unsanitary utensils add more bacteria to milk than all other sources combined. This is particularly true of the milking machine, as its rubber inflations and tubes are far more difficult

to keep clean than a milk pail. As the rubber ages, many tiny cracks develop in it (Figures 1-3). Bacteria lurk and grow in these cracks, as well as in pails and strainers with cracked seams, rust spots and other flaws.

## GENERAL AIDS AND PRACTICES

Good facilities for looking after milking equipment make it easier to keep it clean and sanitary. A properly constructed and equipped milkhouse is the first essential.

The milkhouse should have the following: a concrete or other impermeable, well-drained floor, hot and cold running water, proper twin wash sinks, metal draining racks, milk-cooling facilities and an extension from the vacuum line so that the milker inflations can be pulsated while being suction-washed or sanitized. Good lighting, especially over the wash sink, good brushes and plenty of 'elbow grease' to do a proper scrubbing job are essential, too. A good nylon brush with crimped bristles is best; the bristles don't soften, the brush lasts a long time and you can clean thoroughly with it.

<sup>1</sup> Retired in 1964.



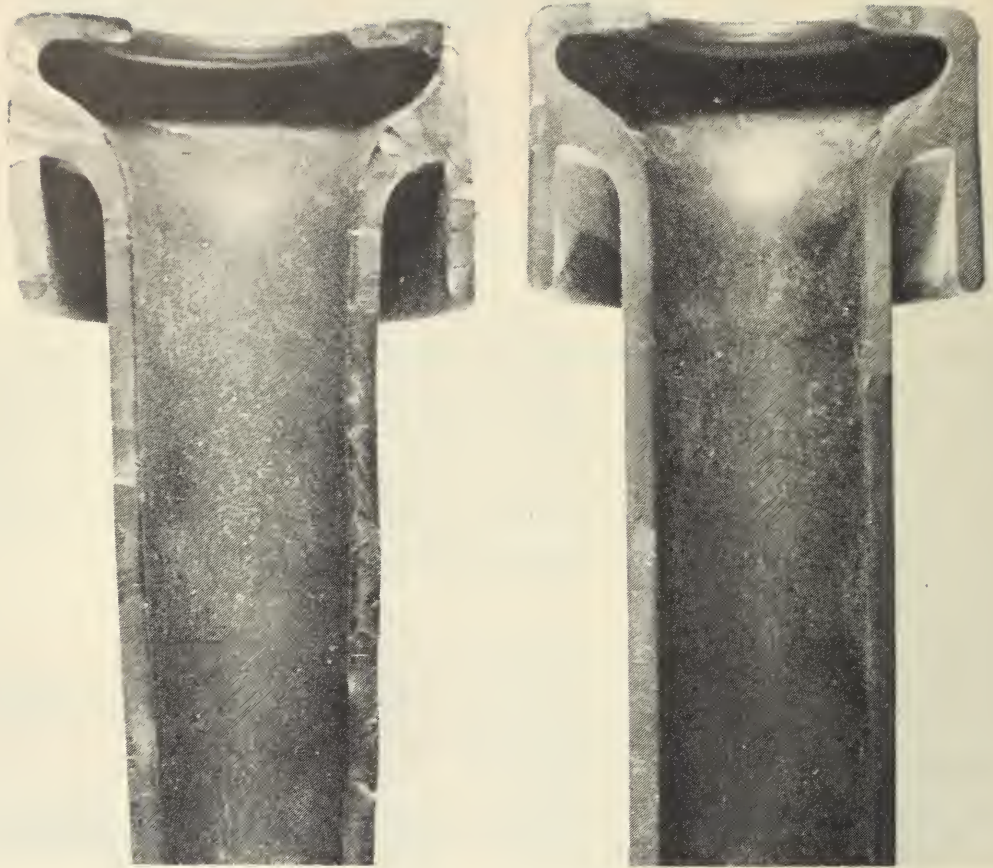


Figure 1—Used (left) and new milker inflations. Natural size.

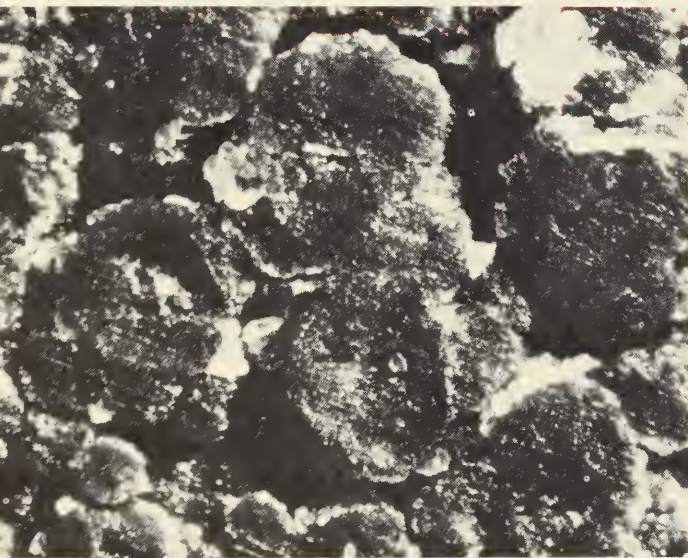


Figure 2—Fine cracks on surface of used milker inflation, not visible to the naked eye. About 60 times natural size.

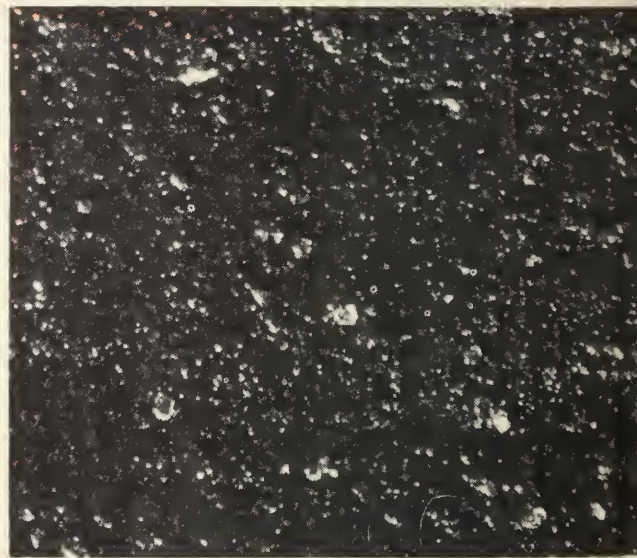


Figure 3—Surface of new milker inflation, showing no cracks. About 60 times natural size.

## Cleaners and Sanitizers

There are many kinds and brands of cleaning and sanitizing chemicals on the market.

As with most things you buy, it does not pay to use a cut-rate product. An inferior product often allows milkstone to form and the expense of removing it far exceeds the initial saving. A top-quality product soon pays for itself.

Some products are better suited to one area than to another. It is best to use a product that experience has shown does a good job in your area. If it fails to work for you, first check the directions and see that you have been following them. If you have, then ask your fieldman to recommend another product that may be better suited to your water supply.

Dairy *cleaners*, or *detergents*, are special products that help to remove milk and other soil from equipment. For manual cleaning, these are all mild enough not to hurt the skin when used as directed. *Alkaline cleaners* are the most common; those developed for very hard water contain enough water-conditioning chemicals to keep hard-water salts from being deposited. *Acid cleaners* were recently developed; they are best used alternately with alkaline products to help keep milkstone or mineral deposits from forming. Still newer are the *neutral cleaners*, which contain chemicals other than alkalies or acids to remove soil.

The type that is best for you depends mainly on your water supply. If it is hard, you need a more expensive type of cleaner, as the water-conditioning chemicals necessary cost more than

the alkaline salts that make up the bulk of an alkaline cleaner. Another possibility is to use an iodophor cleaner-sanitizer; besides cleaning effectively, this kind of product is acid enough to keep milkstone and mineral deposits from forming even in hard water.

Never use soap, as it leaves a film that is hard to rinse off. And never use a perfumed household detergent, as it may give an off-flavor to the milk.

*Sanitizers* are liquids or powders used in solution to kill bacteria on surfaces of milk-handling equipment and udders. They are effective in cold or warm solutions but only on clean surfaces. The germicidal agent may be chlorine, iodine, acid or a quaternary ammonium compound.

*Milkstone removers* are strong acid products for removing milkstone and mineral deposits from equipment. They must be used with care according to the manufacturer's directions, to avoid corrosion of metal surfaces.

*Cleaner-sanitizers*, or *detergent-sanitizers*, are liquids or powders that both clean and sanitize in one operation. The sanitizing agent is usually iodine or a quaternary ammonium compound. Lye solution is also in this group.

## Replacing Rubber Parts

Inspect all rubber parts of milking machines at least once a week for cleanliness and general condition. For best results, replace inflations when they have milked the equivalent of 1,000 cows; for a 30-cow herd milked with three machines, each with two sets of inflations, this would be every three months. Replace long rubber milk hose at least every six months.



Because rubber is porous, it is much more difficult than metal to keep sanitary. The inflations and other rubberware absorb fat from the milk and from the cow's skin. This causes the rubber to soften and blister, shortens its useful life and makes it difficult to clean. Also, old inflations lose their elasticity and slow down the milking process—another reason why it pays to replace them regularly.

## How to Prolong the Life of Rubberware

The simplest way to keep inflations in good condition and free of bacteria is to have two sets and use them alternate weeks. While one is in use, keep the other in a cold 5 percent lye solution. Before using the soaked set, rinse it thoroughly to remove the lye; a final weak acid rinse is helpful. Rubberware treated in this way remains sanitary and lasts much longer than untreated rubberware. This method is also safer, simpler and more convenient than the boiling treatment formerly recommended for defatting rubberware.

Use the 5 percent lye solution also for cleaning the vacuum lines, following the instructions of the milker manufacturer. Clean the lines as often as recommended to remove debris and maintain full capacity. If milk is accidentally drawn into the line, clean it immediately.

## Controlling Milkstone

Use a kind of cleaner that will keep milkstone from forming. In hard-water

areas, use a cleaner with adequate water-softening capacity. If milkstone does form, remove it with a special milkstone remover. To keep it from forming, use an acid-type cleaner or cleaner sanitizer as often as necessary, according to the manufacturer's directions. Also, to help keep milkstone down, use a weak acid rinse after washing.

## UTENSILS

### Pails, Strainers and Shipping Cans

Rinse the milk residue from all utensils, such as pails, strainers and shipping cans, as soon as possible. Have the water warm enough to keep the milk fat from hardening, but never use hot water as it makes the milk proteins stick to the surface. Next, using a nylon brush with crimped bristles, brush the utensils thoroughly with a hot solution of suitable cleaner. *Never* use steel wool or a metal scouring sponge. *Follow the manufacturer's directions carefully*; this is particularly important when you use a detergent-sanitizer containing iodine (iodophor), for at temperatures above 120° F the iodine is released as a vapor that stings your nose and stains the walls and ceiling, etc.

Next, rinse the utensils to remove traces of cleaner and dirt remaining after the brushing. Use *cold* water, preferably acidified, to help keep milkstone from forming, and also mineral deposits from hard water. Finally, shake the utensils to remove as much

water as possible and place them *upside down on a metal drain-rack* (Figure 4) so that they drain thoroughly. Bacteria can grow rapidly on wet surfaces.

## Milking Machines

It is easier to clean the milking machine if you leave it connected to the vacuum line during the initial rinsing and washing. This way more of the milk is removed from the rubber, since the inflations flex with each pulsation.

Immediately after milking the last cow, suck a pailful of clean lukewarm water through each unit. Raise and lower the teat cups so that air and water surge through the cluster alternately; this 'airbrush' action makes the rinse more effective. Swirl the

water around to rinse the inside of the milker bucket, and then pour it out. Wash the gasket and lid of the bucket in the same way as the metal utensils (above). Don't neglect to wash the pulsator and airhose too.

There are three ways of cleaning the teat-cup clusters after the initial rinse:

- Dismantle the clusters, brush them well in a hot cleaner solution, and then rinse in a cold, weak acid solution. This method prevents the rubber parts from sticking to the metal, and also changes their positions and helps prolong their useful life.

- Suck a pailful of hot cleaner solution through each unit. As with the rinsing, the flexing of the inflations helps in removing the milk from the pores of the rubber. You may brush the various parts of the teat-cup cluster without dismantling the machine. If you store the cluster dry between milkings, rinse it with a weak acid solution.

At least once a week, take the cluster apart and examine the rubberware to make sure it is clean and in good condition. Brush and rinse all parts before reassembling them.

- In the method known as 'immersion cleaning,' developed in England and recently introduced into Canada, a strong lye solution is relied on to both clean and sanitize the clusters. After the usual rinse, dismantle the machine and immerse the clusters in a suitable container filled with a 5 percent lye solution and leave them there between milkings. Before assembling the unit, rinse the parts thoroughly with a weak acid solution to remove the lye solution. A complete description of this

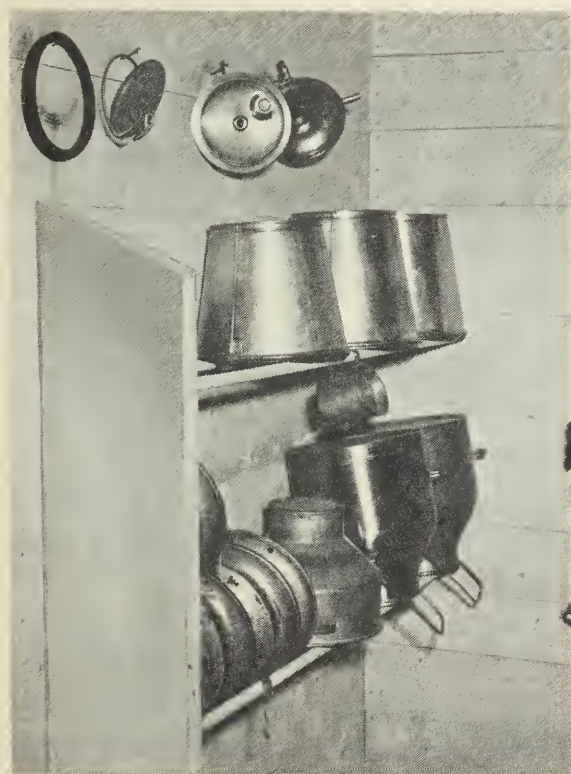


Figure 4—A simple draining rack for utensils.



method may be obtained from the Dairy Branch, Alberta Department of Agriculture, Edmonton.

For pipeline milkers, follow carefully the directions of the manufacturer of the cleaner and sanitizer that you use.

To make up a 5 percent lye solution, add two 9½-ounce cans of flake lye to 9 quarts of *soft* water. Since this solution attacks aluminum and also the glaze on earthenware, use an iron or plastic container such as a plastic garbage pail with a close-fitting lid. Have the rubberware on a plastic rack or in a perforated plastic bucket, so that you can easily remove it from the larger container and rinse it without getting the lye on your skin or clothing. You may use rubber gloves or metal tongs for removing the rubberware from the lye solution but they are less convenient.

Make up enough lye solution to cover the rubberware and allow some for loss. If the rubberware is well rinsed first, the solution is usually good for three months, but if it gets very dirty or soapy discard it sooner. The proper concentration of lye is important; if the solution is too strong the rubber may harden and if it is too weak it will not remove all the fat.

If you use hard water to make the lye solution, milkstone or scale may form on the rubberware. If either begins to form, treat the rubberware in use with an acid cleaner as often as necessary. It is simpler and more effective to use soft water for making the lye solution. Lye compounds containing special chemicals to keep hard-water salts in solution are available; they are very effective.

**Caution:** The 5 percent lye solution must be used with care as it is caustic and burns skin and clothing if not washed off at once. Make sure that the container has a tight lid, and preferably a fastener or weight on it, to keep children from harm.

## How to Store Rubberware between Milkings

Though any film or scale is more easily seen on rubberware stored dry, storage in a weak (0.5 percent) lye solution has given better results than any other method tested at the Central Experimental Farm. The solution not only prevents bacterial growth but also helps keep the rubberware clean by dissolving traces of protein and fat.

To make the 0.5 percent solution, add 2 heaping tablespoons of flake lye to a gallon of *soft* water, or dilute 1 part of 5 percent lye solution (preceding section) with 9 parts of *soft* water. Hard water forms mineral deposits on equipment surfaces. For long-tube milkers, use a solution rack (Figure 5) to ensure using fresh solution after each milking. For short-tube milkers, cover the inflations and the pailhead gasket with solution in a black-iron or plastic pail or glazed earthenware crock and change the solution *at least twice a week*.

## Sanitizing

If equipment surfaces were truly dry, no bacteria would grow on them. However, billions of bacteria can grow



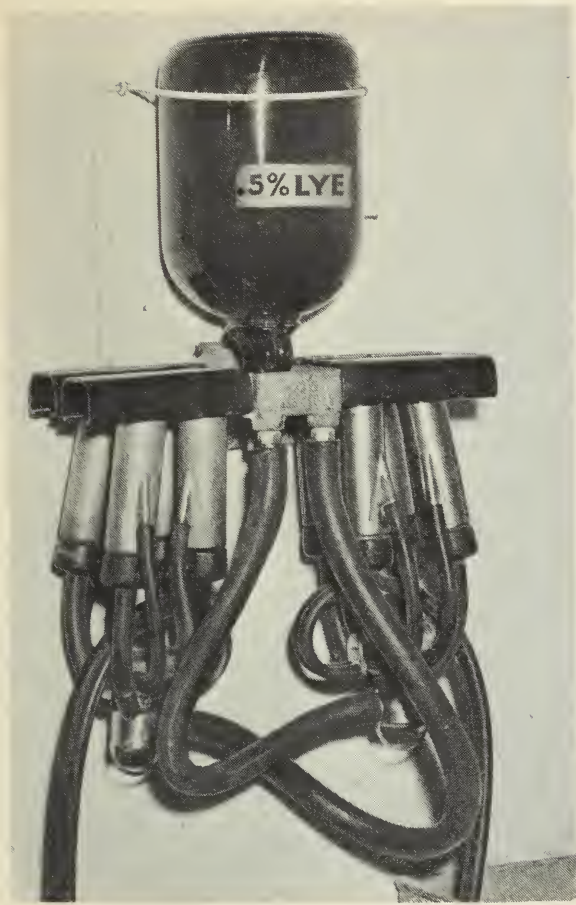


Figure 5—A teat-cup assembly filled with 0.5 percent lye solution on a rack.

on a film of moisture too thin to be seen, and rubber, because it is porous, always contains some moisture. No matter how well the equipment is washed, some bacteria survive and multiply before the next milking. To keep bacteria down, therefore, you must not only do a good job of washing but also sanitize equipment surfaces before the milk comes in contact with them. This is usually done immediately before milking.

The general procedure is as follows: Make up a pailful of sanitizing solution according to the manufacturer's directions, and suck this solution through the teat-cup assembly into the

milker bucket. Swirl the solution around the entire inner surface, then return it to the pail and pass it through each unit in turn. Then rinse strainers, carrying pails and shipping cans with the same solution. Drain each piece of equipment thoroughly before using it. Then add more sanitizer to the used solution, as directed by the manufacturer, and wash the udders with it.

Each type of sanitizer approved for dairy use has its good points. The hypochlorites, which were first in the field, are still widely used because they are cheap, effective and readily available. Though the powder form has the advantage of not freezing, it favors formation of milkstone. The quaternary ammonium compounds, which received a good deal of publicity after World War II, have not been widely accepted in Canada.

An iodophor cleaner-sanitizer does the work of both alkaline and acid cleaners, removes and prevents milkstone and mineral deposits and also kills germs. This type is especially useful for both washing and sanitizing udders. Many dairymen prefer an iodophor because it avoids the risk of using a sanitizer as a cleaner, or vice versa, as often happens.

A new type of sanitizer made of phosphoric acid and wetting agents is available but has not been on the market long enough for its practical value to be fully assessed. It also helps to keep milkstone from forming.

*Remember that sanitizers work well only on clean surfaces.*

## BULK COOLING TANKS

Since washing a bulk cooling tank requires special care, *follow the directions of the detergent manufacturer closely.*

Wash the tank *each time* it is emptied. If this is not done, cold loving bacteria will grow on the unwashed surfaces and cause high bacteria counts in the milk.

In general, the procedure is as follows: After emptying the tank, the tank truck driver usually rinses the

tank with cold water under pressure to remove most of the milk residue. Then wash the tank before any of the surface dries: Remove the agitator and dipstick. Make up a few quarts of detergent solution in a plastic bucket. Close the outlet valve and place the bucket inside the tank. A long-handled nylon brush that will hold plenty of solution is a big help. Dip the brush in the solution and brush the entire inner surface of the tank vigorously, including the underside of the cover and bridge. Drain the solution inside the tank into the bucket and use this to wash the outside of the tank. Wash the agitator, dipstick, and outlet valve separately, using a special brush for the outlet valve. Finally, rinse with clean water, preferably adding an acid-type cleaner or sanitizer.

When the tank walls are wet, it is difficult to tell whether they are clean. If beads of water appear after the rinsing, the surface is greasy. Then scrub it hard again, and rinse; repeat until no beads appear and only a smooth film of water remains after rinsing. To detect 'invisible' film, make a paste of dairy cleaning compound and rub it hard over an area about six inches in diameter. Rinse off with clear water; if this area appears cleaner than the rest, the wall isn't clean (Figure 6). Another way to test is to swab a similar area with an undiluted iodophor compound, which will stain any 'invisible' film present.

Shortly before the next milking, spray or 'fog' the entire inner surface with a good sanitizing solution made up to the recommended strength. A



Figure 6—Film removed from wall of a bulk tank. The dark round area was treated with full-strength iodophor solution. The film could not be noticed where the walls were wet from condensation.





Figure 7—A device for spraying sanitizer solution on inner surfaces of a bulk tank.

handy device (Figure 7) is available that automatically feeds the sanitizer into the cold water line at the required

rate; ask your fieldman about obtaining one. After the tank drains thoroughly it is ready for use.

### OTHER USEFUL PUBLICATIONS

*High-Quality Milk.* Canada Dept. Agr. Pub. 844. 1962.

*Mastitis Must Be Beaten!* Canada Dept. Agr. Pub. 1082. 1960.

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